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**Working Title: Student involvement in the Pluto Mission**
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The Pluto Fast Flyby mission development baseline consists of 2 identical spacecraft (120 -165 kg) to be launched to Pluto/ Charon in the late 1990s[1]. These spacecraft are intended to fly by Pluto and Charon in order to perform various remote-sensing scientific investigations and have a mission development cost < $400M (FY92$) though launch -t 30 days.

The Pluto team is committed to involving students in all areas of mission development and operations. in November 1992, the Pluto team sent a request for information to industry and universities looking for ways to lower the mass and cost of the mission. A number of universities responded with creative and promising technological developments. In addition to contracts with industry and other Federai labs, contracts were signed with schools which ailowed the students to apply their research, enabling the Pluto team to use valuable resources on a variety of advanced technology endeavors. Perhaps the most exciting aspect of these investigations was that the deliverables that the students produced were not just final reports, but actual prototype hardware complete with write-ups on lessons iearned in machining, programming, and design. Another exciting development was a prototype adapter competition in which 7 universities competed to design, build, and test their idea of a lightweight spacecraft-propulsion stack adapter. Georgia Tech won with an innovative dodecahedron composite lattice cone. Other students were invoived in the projects described below:

| Subsystem | University | Project |
|---|---|---|
| Telecom | U of Michigan | Build low-loss power divider |
| Instruments/ S/C System | Caltech/ N. Az. U. (MI) | Payload design, s/c mockup |
| Structure/ bus | Utah State U | Build isogrid bus structure |
| End to End Info. System | Central State U (HBCU) | Build data flow architecture sire. |
| Structure | Harvey Mudd | Design and build stack adapters |
| Flight Computing | U of Baltimore | Recomend data compression |
| Propulsion Stack | Caltech | Build stack motor mockups |
| Flight Computer | Stanford | Build low power CMOS chip |
| Trajectory/ Science | Occidental College | Animation of Pluto/ Charon flyby |
| Trajectory | Purdue | Pluto& Follow-on Trajectories |
| End-to-End Data System | U. of Colorado (Boulder) | Ground Data System |
| End-to-End Data System | Trinity (TX) | Testbed |
| Mission | Southampton (UK) | Pluto mission alternatives |
| Adapter Competition | | Design and build S/C adapter |
| {These 7 universities intend to participate. Abstracts delivered June 28, $ to be awarded 9/93} | -U West Virginia | |
| | -Manhattan College | |
| | -Georgia Inst. of Tech | Winner |
| | -U of Naples (Italy) | |
| | -Tuskegee U (HBCU) | |
| | -U of Central Florida | |

All in all, over 40 students from 20 different colleges made significant contributions to the Pluto Fast Flyby mission development through their efforts. This paper will give an overview of Pluto student involvement, the technologies which they examined, and useful results for the mission.

[1] Staehle, Robert L., et. al., "Expiration of Pluto: Search for Applicable Satellite Technology," Sixth Annual AIAA/ Utah State University Conference on Small Satellites, September 21-24, 1992.